

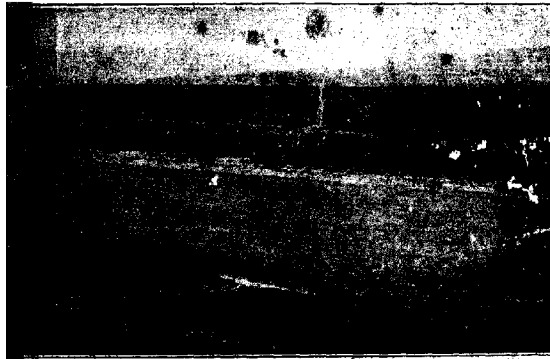
STATE COLLEGE OF WASHINGTON
AGRICULTURAL EXPERIMENT STATION
Pullman, Washington

Division of Farm Management and Agricultural Economics

Economic Aspects of the Washington Fruit Industry

Apricots, Cherries, Peaches, and Pears

by
NEIL W. JOHNSON



BULLETIN NO. 238

April, 1930

bulletins of this Station are sent free to citizens of the State on
application to the Director.

BOARD OF REGENTS

A. W. Davis, President	Spokane
N. A. Ritz	Walla Walla
F. J. Wilmer	Rosalia
F. H. Hulbert	Mount Vernon
Walter R. Rowe	Naselle
E. O. Holland	(President of the College, Secretary)

EXPERIMENT STATION STAFF

E. O. Holland, Ph.D., President	Edward C. Johnson, M. A., Director
Agricultural Engineering	
L. J. Smith, M.E., Agricultural Engineer in Charge.	Chester C. Hampson, M.A., Agronomist
H. L. Garver, E.E., Investigator, Farm Electricity. ¹	E. F. Landerbohm, M.S., Asst. in Farm Management.
Agronomy	
E. G. Schafer, M.S., Agronomist in Charge	Harvey W. Starling, B.S., Asst. in Rural Sociology.
E. F. Gaines, D.Sc., Cerealists.	Home Economics
A. L. Hafenrichter, Ph.D., Asst. in Farm Crops.	Florence Harrison, A. M., Home Economist in Charge.
S. C. Vandecaveye, Ph.D., Soil Biologist.	Evelyn H. Roberts, M.S., Research Specialist in Home Economics.
H. F. Holtz, M.S., Associate in Soils.	VeNona Swartz, M.S., Research Specialist in Foods and Nutrition.
O. E. Barbee, Asst. in Farm Crops.	Horticulture
H. P. Singleton, M.S., Associate in Agronomy, Irrigation Branch Station, Prosser.	E. L. Overholser, Ph.D., Horticulturist in Charge.
C. C. Wright, M.S., Specialist in Irrigation Investigations, Irrigation Branch Station, Prosser. ¹	O. M. Morris, M.S., Horticulturist.
Harley Jacquot, B.S., Asst. in Agronomy, Adams Branch Station, Lind.	C. L. Vincent, M. S., Asst. Horticulturist.
Animal Husbandry	F. L. Overley, M.S., Associate in Horticulture, Wenatchee.
Howard Hackedorf, B.S., Animal Husbandman in Charge.	L. L. Claypool, B.S., Asst. Horticulturist, Irrigation Branch Station, Prosser.
Jerry Sotola, M.S., Asst. Animal Husbandman.	Max B. Hardy, M.S., Assistant.
Chemistry	Plant Pathology
J. L. St. John, Ph.D., Chemist in Charge.	F. D. Heald, Ph.D., Plant Pathologist in Charge.
J. R. Neiler, Ph.D., Associate Chemist.	L. K. Jones, Ph.D., Assoc. Plant Pathologist.
Otto Johnson, M.S., Assistant Chemist.	H. H. Flor, Ph.D., Associate Pathologist, U. S. D. A.
Dairy Husbandry	Geo. D. Ruehle, B.S., Assistant.
E. V. Ellington, B. S., Dairy Husbandman in Charge.	Poultry Husbandry
H. A. Bendixen, M.S., Associate Dairy Husbandman.	John S. Carver, B.S., Poultry Husbandman in Charge.
L. A. Black, Ph.D., Associate Dairy Bacteriologist.	L. W. Cassel, B.S., Asst. Poultry Husbandman.
J. C. Knott, M.S., Superintendent Official Testing.	Veterinary Science
Entomology & Zoology	J. W. Kalkus, D.V.S., Veterinarian in Charge, Western Wash. Exp. Station Puyallup.
R. L. Webster, Ph.D., Entomologist in Charge.	C. E. Sawyer, D.V.S., Research Veterinarian Western Wash. Exp. Station Puyallup.
Anthony Spuler, M.S., Associate Entomologist.	Branch Stations
Farm Management & Agricultural Economics	H. M. Wanser, M.S., Sup. Adams Branch Station, Lind.
Geo. Severance, B.S., Agric. Economist in Charge.	H. P. Singleton, M.S., Superintendent, Irrigation Branch Station, Prosser.
E. F. Dummer, Ph.D., Agric. Economist.	D. J. Crowley, B.S., Specialist in Strawberry Investigations, Cranberry Investigations Laboratory, Longview.
Neil W. Johnson, M.S., Asst. in Farm Management. ¹	

¹In cooperation with the State Committee on the Relation of Electricity to Agriculture.

²In cooperation with the United States Department of Agriculture.

³In cooperation with Chelan County.

⁴Resigned June 1, 1930.

TABLE OF CONTENTS

Summary	4
Introduction	7
Present Status and Planting Trends for the Soft Fruit Crops	8
Apricots	8
Cherries	11
Peaches	14
Pears	17
Explanation of Cost of Production Figures	20
Cost of Producing Apricots in the Wenatchee District	24
Cost of Producing Cherries in the Wenatchee District	27
Cost of Producing Peaches in the Wenatchee District	32
Cost of Producing Pears in the Wenatchee District	36
Depreciation of Soft Fruit Plantings, Wenatchee District	40
Labor Expenditures on the Soft Fruit Crops, Wenatchee District	41
Cost of Producing Apricots in the Yakima District	43
Cost of Producing Cherries in the Yakima District	47
Cost of Producing Peaches in the Yakima District	51
Cost of Producing Pears in the Yakima District	55
Depreciation of Soft Fruit Plantings, Yakima District	59
Labor Expenditures on the Soft Fruit Crops, Yakima District	60
Effect of Yield on Cost of Producing the Soft Fruit Crops	60
Yearly Variation in Yield to be Expected	63
Comparisons of the Soft Fruit Crops	64
Appendix	67

SUMMARY

This study is based on data obtained from personal interviews with approximately two hundred producers of soft fruit crops located in the Yakima and Wenatchee Valleys. Each producer submitted data on the normal expense for labor and material on one of the fruits and gave yields secured and prices received for as many years in the past as he had a record. Cost figures submitted would approximate a 5 year average of yields and returns ending with the 1928 year.

The outlook for the soft fruit crops is summarized in the immediately following paragraphs.

Apricots

California, producing over 95% of the nation's apricots, forecasts an increase over the 1928 situation of 6.83% or 5466 bearing acres by 1932. Washington in addition to plantings sufficient to maintain the 1929 bearing acreage has planted an extra 855 acres which will all be bearing in 5 years time. Washington may then expect 166% of the production of which she was capable in 1929. Little planting activity is found in other western states. A decreasing percentage of the apricot crop is being exported. Consumption of apricots fresh and canned is increasing slowly in the home markets, but not rapidly enough to care for the increases in production already assured. Growers should limit new plantings to those areas where production would still be profitable if returns should fall substantially lower than recent levels.

Cherries

California forecasts by 1932 an increase of 29.68% or over 3730 acres over her 1928 bearing cherry acreage. Utah reports 40% of her 1929 acreage as nonbearing. Oregon doubled her cherry acreage in the 3 years from 1925 to 1928. Washington has planted beyond those trees necessary to maintain the 1929 bearing acreage, 564 acres which are sufficient to increase her crop to 183% of the 1929 production within 7 years time.

With all the key regions of the west making substantial increases in plantings it is highly probable that cherry growers will receive considerably lower returns in the next decade. Cherry planting for a few years following 1930 should be sharply limited if not curtailed altogether.

Peaches

California forecasts a 0.91% decrease of 1254 acres for 1932 from its 1928 bearing peach acreage. Utah, due to severe winter killing is still below the acreage listed in 1925. Colorado in 1929 had nearly a million trees with less than 60% bearing. The Colorado acreage has nearly doubled in the last 5 years. Oregon estimated 3000 acres in peaches in 1925 and only 2500 acres in 1928. Washington besides planting enough to maintain her 1929 bearing area has added 496 acres which means a 40% increase in production by 1933. While planting activity is more quiet in peaches than in any other of the soft fruit crops it is recommended that major plantings be confined to those areas where peaches may be produced at costs well below the average.

Pears

Washington, Oregon, and California produce over 56% of the nation's pear crop and supply over 90% of the entire canned pear output. About half the canned pears are exported. Based on 1928 data, California forecasts a 31.58% increase or 19,728 acres to come into bearing by 1932. Oregon listed 9583 acres in pears in 1920 and 18500 acres or a 193% increase by 1928. Washington has planted enough to maintain her 1929 production and 4089 acres extra which will all be bearing by 1936. This is a 93% increase over the 1929 bearing acreage. A drastic reduction in returns to growers seems inevitable. Under conditions prevailing in 1930 it would seem advisable to forego for some time any new plantings of pears.

Allowing interest on all investments and wages for all labor, the average costs of production found in the Wenatchee District were as follows:

1. Apricots—average of 25 farms—2.8 tons per acre—\$72.06 cost per ton.
2. Cherries—average of 27 farms—8093 lbs. per acre—\$0.058 cost per pound.
3. Peaches—average of 25 farms—768 boxes per acre—\$0.48 cost per packed box.
4. Pears—average of 24 farms—11.01 tons per acre—\$31.92 cost per ton.

These figures cover all legitimate items of cost except depreciation on the plantings which are treated separately. The costs are not representative of conditions over the entire Wenatchee District but are influenced by local conditions where taken.

Costs found in the Yakima District were:

1. Apricots—average of 24 farms—3.45 tons per acre—\$55.35 cost per ton.
2. Cherries—average of 24 farms—7095 lbs. per acre—\$0.066 per pound.
3. Peaches—average of 26 farms—1035 boxes per acre—\$0.46 cost per packed box.
4. Pears—average of 22 farms—11.84 tons per acre—\$24.50 cost per ton.

High yields per acre secured by normal production methods was found to be the most important factor in keeping down the cost of production.

ECONOMIC ASPECTS OF THE WASHINGTON FRUIT INDUSTRY

Apricots, Cherries, Peaches and Pears

NEIL W. JOHNSON

INTRODUCTION

This study has two main purposes; to acquaint the grower of the soft fruit crops with the present status of production and trends in planting in this and competing states and to present figures on the cost of producing these fruits as a basis for cost reduction and increased efficiency among growers.

Approximately two hundred growers were interviewed; each giving data on the cost of producing one of the soft fruit crops. The grower was asked to give yields and returns as far back as he had a record. The cost figures therefore, are not representative of any one year but are an attempt to present average conditions prevailing in the recent past on the farms visited. The data were obtained during the summers of 1927 and 1928.

In both the Yakima and Wenatchee Valleys certain sections specialize in the production of some of the soft fruit crops. Growers interviewed in this study were selected from the localities where these fruits are of major importance.

Because of the variations in soft fruit production caused by such factors as frost injury and ripening date of the fruit, the cost figures presented here are likewise limited in their direct application to areas of similar conditions and are in no wise representative of the results which would obtain in all parts of either district.

Importance of Washington in Production of Soft Fruit Crops

According to the 1920 census the state of Washington had 1.24% of the total bearing apricot trees in the United States and for the year 1919 produced 1.30% of the total apricot crop. No figures for later periods are available since the 1925 census failed to enumerate apricot or cherry data. While the production of a single year is a poor criterion, this record together with the number of bearing trees would indicate that Washington is not a large factor in producing the total apricot crop.

On 3.05% of the nation's bearing cherry trees, Washington produced 6.32% of the total crop in 1919. This indicates the production of but a small portion of the entire cherry crop.

The six year (1923 to 1928 inclusive) average crop of peaches in the United States was 54,915,000 bushels¹. Washington's six year average was 934,000 bushels or 1.7% of the entire crop.

Washington is more prominent in pear production than in any other soft fruit crop. The 1923-'28 average production of pears for the United States was 20,806,000 bushels. The average crop in Washington for this period was 2,523,000 bushels or 12.13% of the total crop of the United States.

PRESENT STATUS AND PLANTING TRENDS FOR THE SOFT FRUIT CROPS

Apricots

Apricot production in the United States is practically monopolized by California. The 1920 census credits her with 96.1% of the nation's acreage and 96.37% of the entire 1919 production. Figure 1 shows the numbers of trees in the 9 leading states for the 1910 and 1920 census periods.

¹ U. S. D. A. Yearbook, 1928, pages 779 and 882

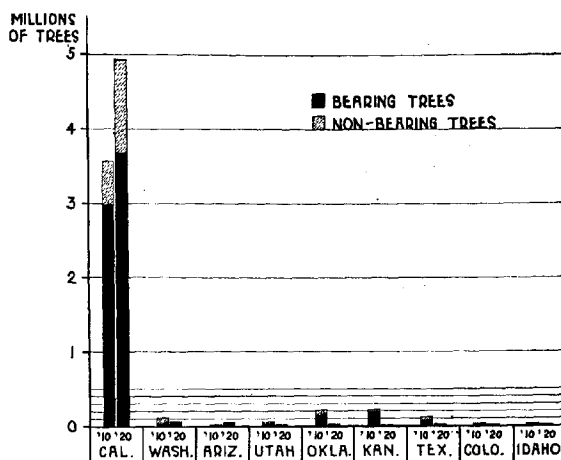


Fig. 1. Bearing and non-bearing trees in nine leading states in apricot production. Census years of 1910 and 1920.

Bulletin 423 of the Agricultural Experiment Station of the University of California, "Apricots" by H. R. Wellman, reveals the following significant facts:

1. Approximately 66% of the California apricot crop is marketed in dried condition, 27% canned and 7% shipped fresh.
2. The United States is not a dried apricot consuming nation and over half of California's dried apricots are exported. While Europe is taking about the same quantity as before the war, with increasing production, exports of dried apricots have dropped from 68% of our total pre-war production to 53% for the five year period ending in 1927. Impaired buying power of the European countries and increasing competition with apricots from Australia and the Union of South Africa are likely to prevent any great increase in the export outlet for dried apricots.
3. While consumption of canned apricots is increasing it is doubtful if expansion will be sufficient to provide an outlet for the bulk of the increased crop. Competition with canned peaches, pears, cherries, pine-apples, etc., tends to act as a check on rapid expansion of the canned apricot market.

4. "There is no immediate prospect that the markets for fresh apricots can be sufficiently widened to provide an outlet for any substantial increase in production."

There is no serious competition between California and Washington apricots that are marketed fresh for two reasons:

1. Most of Washington's apricots are marketed in the northwestern states while most of California's supply goes to eastern states.

2. California's shipping season is usually over before the beginning of the shipping season in Washington.

The "California Crop Report" for 1928 lists 80,033 acres in bearing apricots with a forecasted increase by 1932 of 6.83% of the 1928 acreage or 5466 acres. A survey of all other states west of the Rocky Mountains reveals no great activity in planting except in the state of Washington. Table 1 indicates the present situation in selected counties of Washington.

Table 1. Washington Apricot Situation for Selected Counties*
(95.6 trees per acre)

County	Non-bearing Trees		Bearing Trees	Total Trees
	1—2 years	3—4 years	5 yrs. and older	
Chelan	15686	25815	42160	83661
Douglas	6128	9109	30122	45359
Grant	562	451	2365	3378
Okanogan	9595	9086	9637	28318
†Yakima-				
Kittitas	9572	18048	38247	65867
Total Trees	41543	62509	122531	226583
Per cent of total				
Planting by				
Periods	18.33%	27.59%	54.08%	100.00%

*Chelan, Grant and Southern Douglas county census was taken to include the 1928 crop year. Okanogan, Northern Douglas, Yakima and Kittitas county census was taken to include the 1929 crop year.

†Preliminary figures and only a partial enumeration.

According to the 1920 census these counties contained 75.33% of the state's apricot trees and probably a still higher percentage of the entire state production.¹ The figures in Table 1 were supplied by the offices of

¹ District horticultural inspectors Wendell P. Brown, George Harter and Harold Bliss supplied the census data.

the district horticultural inspectors and represent our most reliable source of this type of information. No adjustment has been made for the difference of one year as indicated in the footnote under Table 1. For forecasting future production it appeared that less error would occur by using the data in its present form than to make a purely arbitrary adjustment for the year's difference in census taking period.

Average figures from the study show 95.6 apricot trees per acre. On this basis there are slightly over 2370 acres of apricots in these counties. Of this, 1282 acres are bearing and 1088 acres are non-bearing. The average of many grower estimates places the life of the apricot tree at 22 years. To maintain the 1282 acres which are now bearing 4.55% or 5575 trees should be planted every year. Since 1925 these counties have planted 81,752 trees or 855 acres *in addition* to that necessary to maintain the present bearing acreage. This surplus represents a 66.72% increase over the acreage in bearing now. Washington is faced with the problem during the next four years of marketing 166% of the present apricot crop. Apricots are not considered in full bearing till they are about 7 years old. Since all trees 5 or more years in age are considered in bearing in Table 1 it will be seen that the above forecast is on a conservative basis.

In view of the situation just presented and the relatively low margin of profit realized by the average grower as discussed in succeeding pages, it would appear unwise to make extensive plantings of apricots except under the most favorable local conditions which would insure high yields produced at extremely low costs.

Cherries

The three Pacific Coast states produced 30.59% of the entire 1919 cherry crop of the United States. Slightly over half this amount was supplied by California. Figure 2 gives the bearing and non-bearing trees for the 1910 and 1920 census periods.

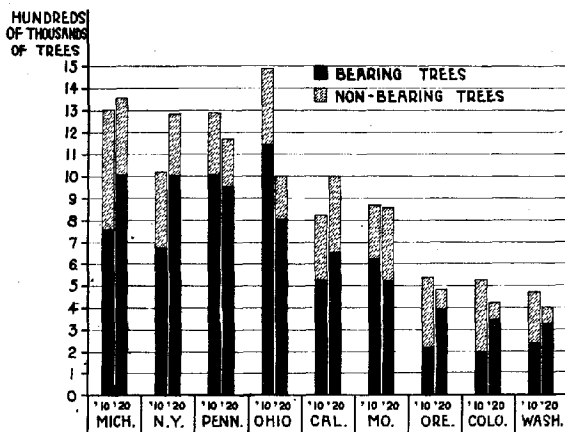


Fig. 2. Bearing and non-bearing cherry trees, selected states, census years of 1910 and 1920.

All the states shown are leaders in production except Washington, Oregon and Colorado which are included because of their bearing on the situation in the West. The 1925 census failed to enumerate cherries.

In 1928 California had 12,569 acres in bearing cherries with a forecasted increase by 1932 of 29.68% or 3730 additional acres. A bearing acreage of 13,260 acres was reported for 1929 with 5,647 acres non-bearing. Out of state shipments for 1927 and 1928 comprised slightly over 38% of the crop, the balance being canned or processed. Approximately 38% of the California acreage is planted to canning varieties, chiefly Royal Annes and 62% is devoted to the black shipping varieties.

While Utah is not one of the leading states in production the cherry acreage in 1927 is reported as 60% in bearing and 40% non-bearing. The agricultural statistician for Utah writes, "The number of cherry trees in Utah is increasing greatly, due to good prospects for the dark sweet shipping varieties and for the light colored sweet and sour cherries." No figures are available as to the acreage or number of trees in Utah for late years. The 1929 census lists 112,695 bearing trees and 7,646 non-bearing which would approximate 1548 acres in bearing and 105 acres non-bearing.

Figures from the agricultural statistician for Oregon show 5,000 acres in cherry trees in 1925. The figure includes both bearing and non-bearing trees. The estimate for 1928 credits Oregon with 10,000 acres in cherries or a 100% increase in three years. This indicates a very large percentage of non-bearing trees. Part of this increase has been in the sour varieties which are included in the Oregon estimates.

Recent reports from Colorado indicate no increases in plantings of sweet cherries. Nearly all activity is displayed in sour cherry plantings, which have doubled in the last ten years; ½ million sour cherry trees being the latest estimate.

Table 2 lists the present condition in selected counties of Washington.

Table 2. Washington Cherry Situation for Selected Counties*
(72.8 trees per acre)

County	Non-bearing Trees			Bearing Trees 8 yrs. and Older	Trees Total
	1—2 yrs.	3—4 yrs.	5—7 yrs.		
Chelan	8761	6943	4071	18795	38570
Douglas	1104	839	435	2447	4825
Grant	268	359	65	878	1570
Okanogan	2206	1283	1142	3016	7647
† Yakima-					
Kittitas	3961	11696	7147	24463	47267
Total Trees	16300	21120	12860	49599	99879
Per cent of total planting by periods	16.32%	21.15%	12.88%	49.65%	100.00%

*Chelan, Grant and Southern Douglas county census was taken to include the 1928 crop year. Okanogan, Northern Douglas, Yakima and Kittitas county census was taken to include the 1929 crop year.

†Preliminary figures and only a partial enumeration.

This material was obtained from the offices of the district horticultural inspectors. The counties enumerated represented 24.87% of the cherry trees in the state in 1919 and probably a much higher per cent of both acreage and production at the present time. Grower estimates placed the full bearing age of sweet cherries at 12.74 years with an estimated life of 37.75 years. Since cherry trees bear to some extent quite early the division between bearing and non-bearing trees has been placed after

the 7th year in Table 2. Over 50% of the trees enumerated are non-bearing. Figuring 72.8 trees per acre there are 1372 acres planted to cherries in these counties. Of this total 681 acres are bearing and 691 acres non-bearing. To maintain the present bearing acreage 2.65% or 1314 trees would have to be planted each year. Over the 7 year non-bearing period 41,082 trees or 564 acres have been planted *in addition* to the acreage necessary to maintain present production. Estimated conservatively, within the next 7 years Washington will have to find a market for 183% of her present production if no more cherry trees are planted.

The cost figures presented in succeeding pages show sweet cherries to have been the most profitable of all soft fruit crops in recent years. This fact is reflected by the recent extensive plantings in all the main cherry producing areas in the West. In view of these facts the outlook would appear to be for reduced prices and considerably lower average profits to cherry growers in the next decade. Additional plantings of cherry trees at this time would seem unwise except under the most favorable circumstances.

Peaches

The 1930 "Agricultural Outlook" published by the Bureau of Agricultural Economics says regarding the peach situation, "Notwithstanding the small crops of peaches in most of the leading areas in 1929, due chiefly to adverse seasonal conditions, the number of trees of bearing age is still so great as to make possible heavy production and unfavorable marketing situations during the next few seasons. In the south the peak of production from trees now in orchards has probably been reached and the trend is expected to be downward. In California the indicated trend in production of clingstone varieties is upward for the next few years whereas the production trend of freestone varieties is expected to continue to decline. In most other peach growing areas only moderate changes in production are in prospect."

Figure 3 indicates the bearing and non-bearing peach trees for selected states for the last 3 census periods.

These states were all leaders in production as of the 1920 census with the exception of Colorado, Utah and Washington which were studied because of their bearing on the situation west of the Rocky Mountains.

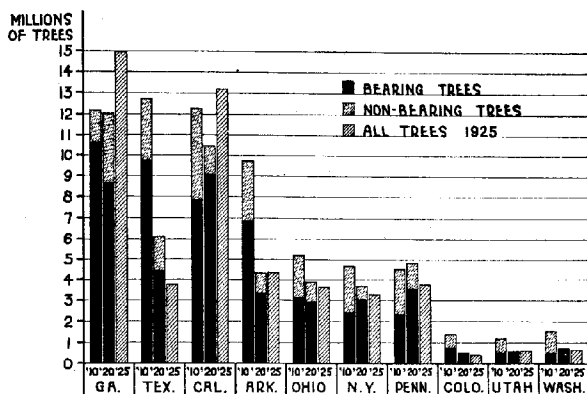


Fig. 3. Bearing and non-bearing peach trees of selected states for the last three census periods. The 1925 census did not separate bearing and non-bearing trees.

About 30% of the trees shown for Georgia in 1925 have been removed or abandoned and new plantings have approximated only one third of the number removed.

The California peach acreage consists of about $\frac{3}{5}$ clingstone and $\frac{2}{5}$ freestone varieties. Seventy to eighty per cent of the clingstones are usually canned, 5 to 10% marketed fresh and the balance are wasted. The freestone varieties have three market outlets, being dried, canned or marketed fresh. The percentage going through each channel varies from year to year depending on price conditions. Usually the larger share of the crop is dried, fresh shipments taking second place and the balance of the crop being canned. The "California Crop Report" for 1928 lists 137,855 acres in bearing peaches of all varieties and forecasts a net decrease by 1932 of 0.91% from the 1928 acreage. This would mean a reduction to 136,601 acres in 1932. For 1929, California reports 136,704 bearing acres and 17,309 non-bearing.

California peaches compete to a considerable extent with Washington peaches in western markets.¹ A study of carlot shipments indicates that the bulk of the California crop is marketed from the first week in July

¹ Circular 1. Agricultural Extension Service, University of California—"Peaches" by H. R. Wellman.

till the middle of September with the peak of the season occurring around August first. Most of the Washington peach crop is marketed from the first week in August till the latter part of September. The peak of Washington shipments occurs about September first. While this is a month later than the peak of California shipments considerable competition between the two areas exists in the latter part of the California marketing season especially in Portland, Seattle and Spokane.

The 1925 census listed 622,021 trees in Utah, of which 88% were bearing and 12% non-bearing. A winter freeze in 1924 killed many trees, but considerable replanting activity followed. The agricultural statistician for Utah estimated 450,000 trees in 1927 and 519,000 for 1928 and stated that plantings were expected to increase.

A check on the present situation in Colorado reveals nearly a million trees planted of which less than 60% are in bearing. Colorado's peach acreage has almost doubled in the last five years.

Estimates from the agricultural statistician for Oregon indicate little activity in peach planting. Three thousand acres in peaches were listed in 1925 and for 1926-27-28 the estimate has been carried at 2500 acres.

Table 3. Washington Peach Situation for Selected Counties*
(114.2 trees per acre)

County	Non-bearing Trees		Bearing Trees	Total Trees
	1—2 years	3—4 years	5 yrs. and older	
Chelan	5072	5582	21516	32170
Douglas	1953	5817	17274	25044
Grant	397	1425	2654	4476
Okanogan	1024	3245	5869	10138
† Yakima-				
Kittitas	21316	37600	94523	153439
Total Trees	29762	53669	141836	225267
Per cent of total planting by periods.	13.21 %	23.82 %	62.97 %	100.00 %

*Chelan, Grant and Southern Douglas county census was taken to include the 1928 crop year. Okanogan, Northern Douglas, Yakima and Kittitas county census was taken to include the 1929 crop year.

†Preliminary figures and only a partial enumeration.

These counties represented 70.66% of the state's peach trees in 1925, and they probably contain a still higher per cent of the state's acreage and production at the present time. These data were obtained from recent studies of tree plantings made by the district horticultural inspectors. Average estimates from many growers place the life of the peach tree at 21.2 years and the full bearing age at 7.48 years. Trees averaged 114.2 to the acre. Of the 1973 acres in peach trees in the counties shown in Table 3, 731 acres, or well over a third are non-bearing, while 1242 acres are bearing. To maintain the present bearing acreage 4.72% or 6695 trees would need to be planted every year. During the last 4 years 56,651 trees have been planted in addition to those necessary to maintain the present bearing acreage. This is an increase of 496 acres and indicates that within 4 year's time Washington will have to market 140% of its present average production.

While planting activity is more quiet in peaches than in any other of the soft fruits it is recommended that major plantings be limited to those areas where peaches may be produced at costs well below the average.

Pears

For the 6 year period 1923-'28 inclusive, Oregon, Washington and California produced 56.12% of the nation's pear crop, and during the last few years they supplied nearly 90% of the total canned pear output for the United States.

Washington and Oregon are now canning about thirty-five times their pre-war output while California supplies almost 60% of the canned pears of the nation¹. About half of the United States' canned pear pack is exported and the United Kingdom takes almost 90% of these exports. Australia is rapidly developing in fruit production and it is probable that the pressure of competition from this source will be felt in maintaining our present favorable position on the British market.

California's 1928 pear crop was its largest to date. It amounted to 224,500 tons, of which Bartlett pears comprised 89%. The California tonnage has in late years been utilized as follows:- 25 to 28% canned, 50 to 55% shipped fresh, and the balance dried or consumed locally.

¹ Bulletin 452, Agricultural Experiment Station, University of California "Economic Aspects of the Pear Industry" by S. W. Ehear.

The peak of the California Bartlett pear shipments to eastern markets occurs the latter part of July, while Washington Bartletts begin to roll east in August and early September. California's late varieties, which start moving after the middle of September, are more serious competitors of Washington pears than their Bartlett crop.

Figure 4 presents the bearing and non-bearing pear trees for the last three census periods in the seven states leading in pear production.

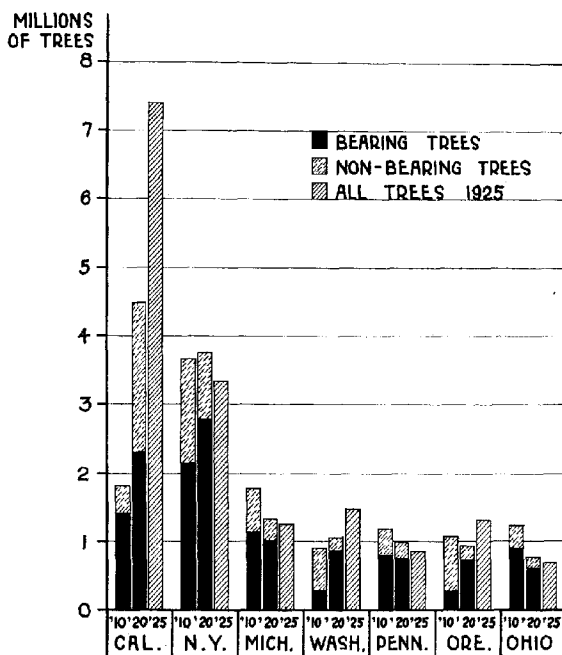


Fig. 4. Bearing and non-bearing pear trees for 1910, '20, and '25 for seven leading states in pear production. Bearing and non-bearing trees were not separated in the 1925 census.

The marked lead held by California is still being maintained. The 1928 "California Crop Report" lists 62,471 bearing acres in pears and forecasts for 1932 an increase of 31.58% or an additional 19,728 acres

which will be bearing at that time. For 1929 California had 69,461 acres in bearing with 24,620 non-bearing.

The 1920 census showed a considerable decrease both in bearing and non-bearing trees in Utah from the 1910 situation, and production figures for later years indicate no marked increase.

Authorities in Colorado estimate 350,000 pear trees in 1929, of which 90% are bearing. This represents a 30 to 40% increase in plantings during the last ten years with continued planting activity. Because of better soil adaptation pears are now replacing apple plantings in the Grand Valley.

Figures from the agricultural statistician for Oregon show 9583 acres in pears in 1920. This amount has been steadily expanded till the 1928 estimate was 18,500 acres or nearly double that of 1920.

The situation in Washington has shown even greater activity. Table 4 lists recent data obtained from the offices of the horticultural inspectors and covers counties that contained over 75.71% of the state's trees in 1925 and probably a still higher per cent of the entire state production.

Table 4. Washington Pear Situation for Selected Counties*
(104.98 trees per acre)

County	Non-bearing Trees			Bearing Trees 8 yrs. and Older	Total Trees
	1—2 yrs.	2—4 yrs.	5—7 yrs.		
Chelan	46229	67600	46040	97684	257553
Douglas	7191	2535	5593	19274	34593
Grant	830	460	5	11031	12326
Okanogan	9807	8784	8733	10643	37967
† Yakima-					
Kittitas	80579	115595	113239	322571	631984
Total Trees	144636	194974	173610	461203	974423
Per cent of total planting by periods	14.84 %	20.01 %	17.82 %	47.33 %	100.00 %

*Chelan, Grant and Southern Douglas county census was taken to include the 1928 crop year. Okanogan, Northern Douglas, Yakima and Kittitas county census was taken to include the 1929 crop year.

†Preliminary figures and only a partial enumeration.

Estimates from large numbers of growers placed the average life of the pear tree at 38.3 years with full bearing at the 11th year. The orchards studied averaged 104.98 trees per acre. In the data of Table 4 the division between bearing and non-bearing trees has been placed at the end of the seventh year. While 8 year old trees are not in full production this division was made to lend conservatism to the data. Over 52% of the trees listed in Table 4 are non-bearing and 35% are not over 4 years of age. To maintain the present bearing acreage 2.6% of the number of bearing trees should be planted each year. During the last 7 years plantings have been sufficient to maintain the present bearing acreage, and in addition 429,283 trees or 4089 acres, mostly of the Bartlett variety, have been planted.

At present there are 9282 acres planted to pears in these counties, of which 4889 acres are non-bearing and 4393 acres bearing. This unparalleled planting orgy indicates that a market outlet must be sought within the next ten years for 193% of our present production. It does not take much of a prophet to point to very drastic reductions in returns on pears in the near future. Overplanting seems in evidence in all major pear producing areas in the West with no promising outlet in sight for the inevitable surplus. It would seem wise to forego contemplated plantings of pears except under the most favorable conditions.

EXPLANATION OF COST OF PRODUCTION FIGURES

Since the same method was used in calculating production costs on each fruit crop studied, a general explanation of the cost figures is given which will be applicable to all.

Land investment per acre.

Land investment includes only the value of the land with water right and full bearing trees upon it. Any investment in buildings or irrigation system is excluded.

If the money invested in orchard enterprise were placed instead in conservative securities the grower might hope to realize an interest return of 6% on his investment. This rate is therefore charged as part of the cost of producing the crop.

Equipment investment per acre.

The investment per acre in equipment is small because only the minor items such as pruning tools, picking bags, pails and ladders are included. Charges for the use of the larger implements such as tractors and spray rigs are covered in the labor costs at so much per hour for the use of the machine. This method of calculation is known as "Job rate per hour" and is more fully explained under "Cultural Labor Costs". Since several fruit crops were usually grown on the farms studied and all shared in the use of the larger implements "Job rate per hour" seemed the most feasible way to make the proper charge to the crop in question.

Six per cent interest on the capital invested in equipment is charged as a cost on both the minor tools listed under "Equipment investment per acre", and the larger machines whose cost is figured in with labor. The life of a machine depends largely on the amount of work it has to do and the care given it. This is a variable factor on different farms. Depreciation rates on equipment are not arbitrary but were determined by consultation with each grower to obtain a charge representative of his own conditions.

Irrigation system investment per acre.

The investment in irrigation system varies from that in open ditches to heavy outlays for systems of concrete or metal pipe. Depreciation and repairs likewise vary with the permanence of the system in use.

Miscellaneous overhead charges.

Land tax on the individual ranch is governed by such factors as amount of improved and unimproved land, character of water right, type of soil, lay of land, kinds and varieties of fruit grown, age of trees, number of feet of lift if water must be pumped up to the land, and the amount of improvements on the tract. Water tax is determined largely by whether the system is owned by some development company, by few or many farmers, or is a government project.

Water charges are made up on levies for "Maintenance" and "Construction". Under systems making extensive improvements the "Construction" charge may be quite heavy. While construction expense is strictly an improvement, annual payments are made over a sufficient period of time to justify classing it as an item of current expense and

it is added to the "Maintenance" charge as part of the yearly water tax in the cost figures.

Crop insurance to cover damage by hail, etc., is carried by relatively few farmers, hence the average per acre figure as shown is quite low.

Liability insurance providing for payments to employees for injuries sustained while working for the employer is as yet carried by but few growers.

Cultural materials costs.

Under this heading all the material used in growing the crop is listed. Spray preparations and fertilizers are the items common to all localities while fuel for orchard heating and compounds to combat uncommon insects or diseases are used in certain localized areas.

Cultural labor costs.

Each item of labor in growing the fruit has been figured on the basis of "Job rate per hour." If two men with a team and wagon are disposing of the brush and rates are 60 cents for a man and team and 40 cents for a single man the job rate would be \$1.05 for each hour the crew worked. (Five cents per hour was allowed for the use of plows, wagons, ditchers and discs.) The cost per hour for tractors and spray rigs was determined separately for each ranch by figuring the year's expense on the machine for interest, depreciation, repairs, insurance, gas, oil, etc., dividing by the number of hours of use. The figures in every case list the entire cost of the job, valuing the labor of the grower and his family at the same rate as that of hired hands.

Interest on operating expense to harvest.

This charge covers interest on the money expended in financing the crop till harvest time. Six per cent interest for six months was the rate used.

Total cost ready to harvest.

This amount is obtained by adding to total overhead costs the charges for cultural material, cultural labor and interest on operating expenses. This cost is figured both with and without interest on the investment in land to satisfy those who do not consider land interest a part of the cost as well as those who consider it to be a legitimate charge.

Harvesting costs.

Harvesting expenses vary with the size of the crop produced. The picking charge covers labor only, all costs for use of bags and ladders being figured under "Equipment investment per acre" in the overhead

costs. Charges for the use of equipment in the hauling operations have again been included on the basis of job rate per hour. The supervision charge covers the time of the grower or a "field boss" in keeping the picking crew busy and in seeing that the fruit is handled with all possible care.

Interest on operating expense during harvest.

Six per cent interest for six months was allowed for the money expended in harvesting the crop. While the harvest season on soft fruits seldom exceeds a month many of the growers are forced to borrow to meet these expenses. The money thus borrowed may often run for six months before repayment, for the returns of soft fruit are often withheld that long if the grower sells through a pool.

Total cost delivered at warehouse.

The total cost of producing the fruit and delivering it to the warehouse is given both including and excluding interest on land. Since the money invested in land is as real as that invested in any other factor in production the inclusion of this item would seem just as feasible as any other interest charges.

Receipts and profits.

Returns for the various fruits are averages of prices received during late years. The figures represent approximately a five year average, the last year being 1928.

All legitimate costs have been included in the figures except depreciation on the orchard planting itself. This cost will be discussed later for all the fruits studied. Only the true profit is shown after the grower's own labor and interest and depreciation charges on the various items of investment have been met.

In interpreting any of the average figures given in this bulletin one must remember that 27 farms are the largest number on which an average is based. The smaller the number of farms included the more the average figure is influenced by the situations peculiar to the individual farms. For this reason sizeable variations from the average cost are to be expected in parts of each district, which are subject to differing conditions, and in no case are the figures to be taken as representative of conditions prevalent through the entirety of either district.

Cost of Producing Apricots in the Wenatchee District.

(See Page 20 for detailed explanation of terms and method of figuring cost.)

Twenty-five apricot producers were interviewed in the Wenatchee District. Most of the farms were located south and east of Wenatchee in the upland country and in the Malaga district. The average age of the trees studied was 12.6 years. Growers estimated the full bearing age of apricots at 7 to 8 years. The figures, which are presented in Table 5, cover the Moorpark variety, which is by far the leading apricot in the Wenatchee district.

Table 5. The Average Cost of Producing Apricots on 25 Farms in the Wenatchee Valley.

	PER ACRE FIGURES	PER TON FIGURES
Average Yield per Acre	2.80 tons	
OVERHEAD COSTS		
Land investment per acre		
Average of 25 farms.....	\$809.75	
*6% interest on land value	\$48.58	\$17.37
Equipment investment per acre		
Average of 25 farms.....	\$ 6.75	
*6% interest on investment	.40	
* Depreciation	1.38	
Total Equipment costs	1.78	.64
Irrigation system investment per acre		
Average of 25 farms.....	\$ 45.79	
*6% interest on investment	2.75	
* Depreciation	3.49	
Repairs	.24	
Total system costs	6.48	2.32
Miscellaneous overhead charges		
* Land tax	6.34	
* Water tax	15.59	
Crop insurance	.65	
Total miscellaneous overhead	22.58	8.07
TOTAL OVERHEAD COSTS	79.42	28.40

* Costs that do not normally vary with yield.

(Continued on next page.)

Table 5 (Continued)

	PER ACRE FIGURES	PER TON FIGURES
CULTURAL MATERIAL COSTS		
*Spray materials	\$3.58	\$
* Fertilizer or manure (cost spread)	5.93	
Total cultural material	9.51	3.40
CULTURAL LABOR COSTS		
* Pruning	10.32	
* Brush disposal	3.57	
* Cultivating (Disc, harrow or plow)	10.03	
* Ditching out	2.31	
* Irrigating	8.38	
* Spray labor	3.16	
Thinning	20.41	
Propping	.39	
* Cutting sprouts	1.85	
* Hoeing around trees	1.50	
Miscellaneous	.13	
Total cultural labor cost	62.05	22.19
Interest on operating expense to harvest	2.83	1.01
Total cost ready to harvest		
without interest on land	105.23	37.63
Total cost ready to harvest		
with interest on land	153.81	55.00
HARVESTING COSTS		
Picking		8.31
Hauling in and out of orchard		3.78
Hauling to warehouse		2.78
Supervising harvest labor		1.69
Total harvesting costs	46.31	16.56
Interest on operating expense during harvest	1.39	.50

(Continued on next page)

Table 5 (Continued)

	PER ACRE FIGURES	PER TON FIGURES
Total cost delivered at warehouse (Excluding land interest)	\$152.93	\$24.69
Total cost delivered at warehouse (Including land interest)	201.51	72.06
Average receipts per ton		79.42
Net profit per ton		7.36

* Costs that do not normally vary with yield.

The average value of land in apricots seems low because many of these ranches were located on the upland farms. Land values here are somewhat reduced because of the more rolling topography and the high cost of water which in most cases must be pumped from the lower levels. This condition is reflected in the average tax figures showing a low land tax and a high charge for water.

Very few of the growers interviewed carried crop insurance. Only one spray is normally applied to apricots and no orchard heating was used. Care was taken in compiling the average figures to exclude all tracts on which crop failures were the rule rather than the exception.

The average of \$201.51 is the lowest cost per acre on any of the soft fruits studied in the Wenatchee District. The average receipts of \$79.42 per ton are satisfactory. The small profit per ton seems to be largely due to the low yield per acre obtained by the average grower. Figure 5 shows the yield obtained on each farm studied.

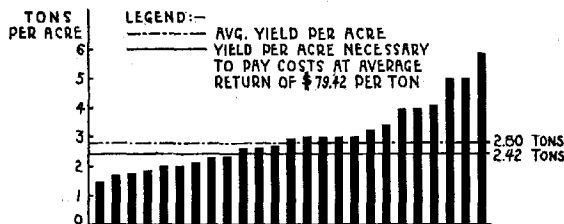


Fig. 5. Each bar indicates the average per acre yield of apricots obtained on one orchard in the Wenatchee District. The 25 bars represent all the apricot tracts studied in this area.

Nine of the twenty-five farms failed to obtain yields large enough to break even with the average cost. Seventeen of the farms had average yields not to exceed three tons per acre. A frequency distribution of the yields follows:

Range in yield per acre	Number of farms
Up to 2 tons	6
2.01 to 3 tons	11
3.01 to 4 tons	4
4.01 to 5 tons	3
5.01 to 6 tons	1

Three farms which produced per acre yields of 5 tons, 5 tons and 5.95 tons respectively netted an average profit of \$166.67 per acre. The net profit per acre on the average yield of 2.8 tons was \$20.61. For profits comparable to those received on the other soft fruit crops it would seem that yields well above the average must be obtained.

Cost of Producing Cherries in the Wenatchee District

(See page 20 for detailed explanation of terms and method of figuring cost.)

Twenty-seven Wenatchee growers were interviewed as the basis for these figures. The farms were selected from an area contiguous to the city of Wenatchee and from the upland district to the south and east of Wenatchee. The average age of the trees on which figures were obtained was 20.13 years. Varieties represented are the Bing, Lambert and Royal Anne (Napoleon). The cost of producing these varieties is quite similar but returns vary widely. The Bing and Lambert are sold chiefly for fresh consumption and command approximately the same price. The Royal Anne (Napoleon) is sold mainly to canneries at prices as much as five cents less per pound than those paid for the black varieties. The average return per pound as quoted in the cost data refers to the Bing cherry. The figures are shown in table 6.

**Table 6. The Average Cost of Producing Cherries on 27 Farms
in the Wenatchee Valley.**

	PER ACRE FIGURES	PER POUND FIGURES
Average Yield per Acre	8093 pounds	
OVERHEAD COSTS		
Land investment per acre		
Average of 27 farms.....	\$1672.27	
*6% Interest on land value	\$100.33	\$.0124
Equipment investment per acre		
Average of 27 farms.....	\$ 48.18	
*6% interest on investment	2.89	
* Depreciation	10.82	
Repairs	.10	
Total equipment costs	13.81	.0017
Irrigation system investment per acre		
Average of 27 farms.....	\$ 46.66	
*6% interest on investment	2.80	
* Depreciation	3.34	
* Repairs	.43	
Total system costs	6.57	.0008
Miscellaneous overhead charges		
* Land tax	16.31	
* Water tax	19.44	
Liability insurance	.43	
Total miscellaneous overhead	36.18	.0045
TOTAL OVERHEAD COSTS	156.89	.0194

* Costs that do not normally vary with yield.

(Continued on next page)

(Table 6 Continued)

	PER ACRE FIGURES	PER POUND FIGURES
CULTURAL MATERIAL COSTS		
*Spray material	\$ 8.71	\$
*Fuel for heaters	.03	
*Fertilizer or manure (cost spread)	31.68	
*Bee hire	2.82	
Miscellaneous	.17	
Total cultural material	43.41	.0054
CULTURAL LABOR COSTS		
*Pruning	9.41	
*Brush disposal	2.08	
*Cultivating (Disc, harrow or plow)	7.05	
*Ditching out	2.50	
*Irrigating	11.09	
*Pollenizing	1.39	
*Spray labor	7.16	
*Heating labor	.97	
*Hoeing around trees	3.12	
Miscellaneous labor	.58	
Total cultural labor cost	45.35	.0056
Interest on operating expense to harvest	3.76	.0004
Total cost ready to harvest without		
interest on land	149.08	.0184
Total cost ready to harvest with interest		
on land	249.41	.0308
HARVESTING COSTS		
Picking		.0199
Hauling in and out of orchard		.0018
Hauling to warehouse		.0021
Supervising harvest labor		.0022
Total harvest costs	210.51	.0260

(Continued on next page)

Table 6 (Continued)

	PER ACRE FIGURES	PER POUND FIGURES
Interest on operating expense during harvest	\$6.32	\$.0008
Total cost delivered at warehouse		
(Excluding interest on land)	365.91	.0452
Total cost delivered at warehouse		
(Including interest on land)	466.24	.0576
Average receipts per pound		.1140
Net profit per pound		.0564

* Costs that do not normally vary with yield.

Land in full bearing cherries is valued higher than land in any other fruit crop in the district and from the standpoint of returns the higher value seems justified.

The equipment investment of \$48.18 per acre is made up largely of ladders, pails, scales and other items used during harvest. Depreciation is quite heavy on material of this type. Charges for the use of the more important pieces of machinery are included in the labor costs as explained on page 21.

Overhead cost, made up chiefly of interest and depreciation charges composes 33.65% of the total cost of producing the crop.

Cherries normally receive only one spraying per year. Only two of the twenty-seven Wenatchee growers heated their orchards which accounts for the extremely low average cost for both fuel and labor in heating.

Eight of these growers have bees placed in the orchards during the blossoming period to aid in pollination. Where faulty pollination is a common occurrence the grower cuts blossoms from a good pollinating variety and hangs them in cans of water in his trees of commercial varieties. This labor is entered under labor costs as "Pollenizing." The operation is usually performed on the older plantings which were set out before the pollenizing habits of the cherry were generally understood.

A net profit of 5 $\frac{2}{3}$ cents per pound was realized above cost when the average return on Bing cherries was 11 4-10 cents per pound. While costs remain substantially the same, returns vary quite markedly

depending on the earliness with which fruit ripens. In a certain locality returns on Bing cherries have seldom been over 7 cents per pound. Less than 20 miles away at a lower elevation, an 11 cent average return has been obtained. Production costs are nearly the same in both areas, yet profits are reduced by 80% due to the later ripening of the fruit. This condition is especially true on all soft fruit crops which depend on fresh consumption for their main outlet.

Figure 6 illustrates the individual yields which were average for the farms studied.

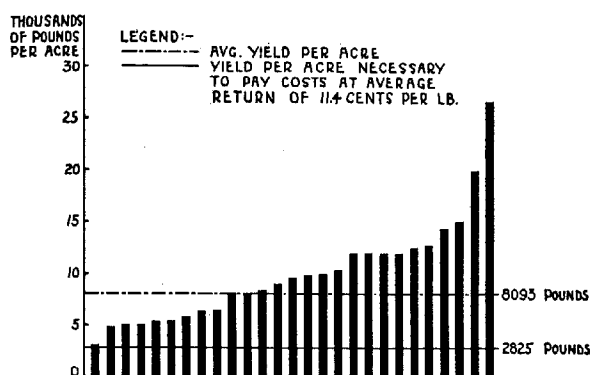


Fig. 6. Each bar indicates the average per acre yield of sweet cherries obtained on one orchard in the Wenatchee District. The 27 bars represent all the cherry tracts studied in this area.

Every farm was producing at some degree of profit and the wide margin between the 2,825 pounds needed to break even and the average yield of 8,093 pounds per acre indicates a very satisfactory profit. A frequency distribution of the average cherry yields is also presented:

Range in yield per acre	Number of farms
Under 4000 pounds	1
4001 to 8000 pounds	10
8001 to 12000 pounds	10
12001 to 16000 pounds	4
16001 to 20000 pounds	
Over 20000 pounds	1

Cherries were the most profitable tree fruit studied in either valley. In view, however, of the greatly accelerated planting in this state it is extremely doubtful if this condition will continue long. This point is discussed more fully under trends in planting on page 11. In the past, expansion of the cherry acreage has been retarded largely because the harvesting date coincides with the thinning and spraying of apples. This labor conflict calls for large amounts of hired labor for jobs both needing the careful supervision of the grower.

Cost of Producing Peaches in Wenatchee District

(See page 20 for detailed explanation of terms and method of figuring costs.)

The data on peach costs were obtained from twenty-five growers located for the most part south and east of Wenatchee chiefly in the Malaga District.

The average age of trees was 15.4 years with the growers estimating peach trees to be in full bearing at 7 years. The main variety is the Elberta. Since peaches are frequently ranch packed the cost figures cover all expense of growing, harvesting, and delivering the box of packed fruit to the warehouse.

A small charge per acre is shown under "Overhead costs" for the yearly expense of the structure of more or less temporary nature which houses the growers packing operation. The average figures for land and water taxes on the different soft fruits fluctuate widely due to the influence of the various districts from which the farms were taken. Only one of the twenty-five growers carried crop insurance and none sustained charges for orchard heating, pollenizing, or tree banding operations. The final cost per packed box delivered at the warehouse was slightly over 48 cents. With average returns of 63 cents a net profit of 15 cents per box is realized. On the average yield of 768 boxes per acre the average net profit was \$115.20 per acre on these farms in the Wenatchee District. The figures for the production costs of peaches are shown in Table 7.

Table 7. The Average Cost of Producing Peaches on 25 Farms in the Wenatchee Valley.

	PER ACRE FIGURES	PER BOX FIGURES
Average Yield per Acre	768 boxes	
OVERHEAD COSTS		
Land investment per acre		
Average of 25 farms.....	\$914.63	
*6% interest on land value	\$54.88	\$.0714
Equipment investment per acre		
Average of 25 farms.....	23.46	
*6% interest on investment	1.41	
*Depreciation	4.61	
Repairs	.08	
Total equipment costs	6.10	.0079
Building investment per acre		
Average of 25 farms.....	2.62	
*6% interest on investment	.15	
*Depreciation	.13	
Miscellaneous	.01	
Total building costs	.29	.0004
Irrigation system investment per acre		
Average of 25 farms.....	53.90	
*6% interest on investment	3.23	
*Depreciation	4.31	
Total system costs	7.54	.0098
Miscellaneous overhead charges		
* Land tax	13.32	
* Water tax	13.76	
Crop insurance	.21	
Total miscellaneous overhead	27.29	.0355
TOTAL OVERHEAD COSTS	96.10	.1250

* Costs that do not normally vary with yield.

(Continued on next page)

Table 7 (Continued)

	PER ACRE FIGURES	PER BOX FIGURES
CULTURAL MATERIAL COSTS		
*Spray material	\$6.20	\$
*Fertilizer or manure (cost spread)	7.52	
Total cultural material	13.72	.0179
CULTURAL LABOR COSTS		
* Pruning	24.82	
* Brush disposal	4.14	
* Cultivating (Disc, harrow or plow)	5.01	
* Ditching out	2.22	
* Irrigating	10.97	
* Spray labor	3.94	
Thinning	16.27	
Propping	2.50	
* Hoeing around trees	.51	
Miscellaneous	.51	
Total cultural labor cost	70.89	.0923
Interest on operating expense to harvest	3.36	.0044
Total cost ready to harvest without interest on land	129.19	.1682
Total cost ready to harvest with interest on land	184.07	.2396
HARVESTING COSTS		
Picking		.0472
Hauling in and out of orchard		.0134
Hauling to warehouse		.0190
Supervising field labor		.0063
Packing labor		.0317
Packing materials (box-paper-nails)		.1034
Lidding and "flunky"		.0102
Supervising packing labor		.0033
Total harvesting costs	180.16	.2345

(Continued on next page)

Table 7 (Continued)

	PER ACRE FIGURES	PER BOX FIGURES
Interest on operating expense during harvest	\$5.40	\$.0070
Total cost delivered at warehouse (Excluding land interest)	314.75	.4097
Total cost delivered at warehouse (Including land interest)	369.63	.4811
Average receipts per box		.6338
Net profit per box		.1527

* Costs that do not normally vary with yield.

Figure 7 indicates the average yields experienced on each of the farms studied.

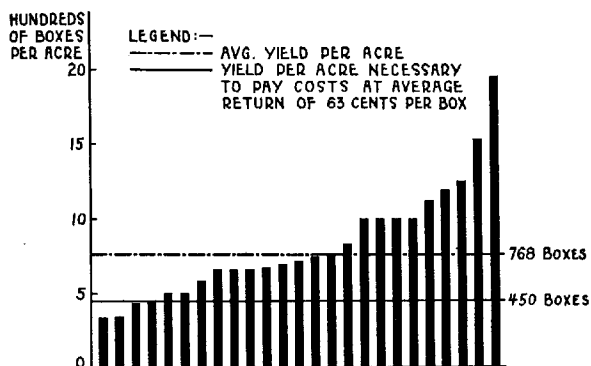


Fig. 7. Each bar indicates the average per acre yield of peaches obtained on one orchard in the Wenatchee District. The 25 bars represent all the peach tracts studied in this area.

All but four of the 25 farms realized yields greater than the 450 boxes necessary to meet the expenses of producing the crop.

A frequency distribution of the individual yields follow:

Range in yield per acre	Number of farms
Under 500 boxes	4
501 to 1000 boxes	12
1001 to 1500 boxes	7
Over 1500 boxes	2

The reader is referred to page 14 for a discussion of the future outlook for the peach industry.

Cost of Producing Pears in the Wenatchee District.

(See page 20 for detailed explanation of terms and method of figuring costs.)

The twenty-four farms which form the basis for the pear study were located over a territory extending from Peshastin to Malaga. The average age of the trees was 16 years and the growers estimated a pear tree to be in full bearing at 11 years. The main variety studied was the Bartlett pear and the returns given in the figures are for this variety. Bosc, D'Anjou, Flemish Beauty and Winter Nellis pears are also produced on a more limited commercial scale and are usually sold as packed fruit.

The average per acre value of pear land is influenced by the location of the farms studied. Most of these ranches were located on the valley floor near paved roads and in the older sections of the valley.

The investment in the minor items of equipment is increased by the addition of large quantities of props used to prevent heavy loads of fruit from breaking the branches at harvest time.

Four of the twenty-four growers hired bees to aid in pollination during the blossoming period. None of these growers heated their orchards.

A total cost of \$31.92 per ton delivered at the warehouse was borne on an average yield of 11.01 tons. With an average return on Bartlett pears in late years of \$44.85 a profit of \$12.93 per ton remains, or \$142.36 per acre. The pear production costs in the Wenatchee District are shown in Table 8.

Table 8. The Average Cost of Producing Pears on 24 Farms in the Wenatchee Valley.

	PER ACRE FIGURES	PER TON FIGURES
Average Yield per Acre	11.01 T.	
OVERHEAD COSTS		
Land investment per acre		
Average of 24 farms.....	\$1417.54	
*6% interest on land value	\$85.05	\$7.72
Equipment investment per acre		
Average of 24 farms.....	28.72	
*6% interest on investment	1.73	
* Depreciation	5.46	
Repairs	.10	
Total equipment costs	7.29	.66
Irrigation system investment per acre		
Average of 24 farms.....	94.19	
*6% interest on investment	5.65	
* Depreciation	9.70	
Repairs	.42	
Miscellaneous	.21	
Total system costs	15.98	1.45
Miscellaneous overhead costs		
* Land tax	20.49	
* Water tax	13.39	
Total miscellaneous costs	33.88	3.08
TOTAL OVERHEAD COSTS	142.20	12.91

* Costs that do not normally vary with yield.

(Continued on next page)

	PER ACRE FIGURES	PER TON FIGURES
CULTURAL MATERIAL COSTS		
*Dormant spray material	\$6.59	\$
* Cover spray material	8.29	
* Fertilizer or manure (cost spread)	10.44	
* Bee hire	1.17	
Miscellaneous	.15	
Total cultural material	26.64	2.42
CULTURAL LABOR COSTS		
* Pruning	17.09	
* Brush disposal	5.12	
* Cultivating (Disc, harrow or plow)	5.65	
* Ditching out	1.66	
* Irrigating	17.29	
* Dormant spray labor	6.03	
* Cover spray labor	20.71	
Thinning	13.73	
Propping	6.26	
* Hoeing around trees	2.60	
Miscellaneous	3.02	
Total cultural cost	99.16	9.00
Interest on operating expense to harvest	4.81	.44
Total cost ready to harvest without interest on land	187.76	17.05
Total cost to harvest with interest on land	272.81	24.77
HARVESTING COSTS		
Picking		4.22
Hauling in and out of orchard		1.00
Hauling to warehouse		1.34
Supervising harvest labor		.38
Total harvesting costs	76.38	6.94
Interest on operating expense during harvest	2.29	.21

* Costs that do not normally vary with yield.
(Continued on next page.)

Table 7 (Continued)

	PER ACRE FIGURES	PER TON FIGURES
Total cost delivered at warehouse (Excluding interest on land)	\$266.43	\$24.20
Total cost delivered at warehouse (Including interest on land)	351.48	31.92
Average receipts per ton		44.85
Net profit per ton		12.93

* Costs that do not normally vary with yield.

Figure 8 shows the average yields obtained on the individual farms studied.

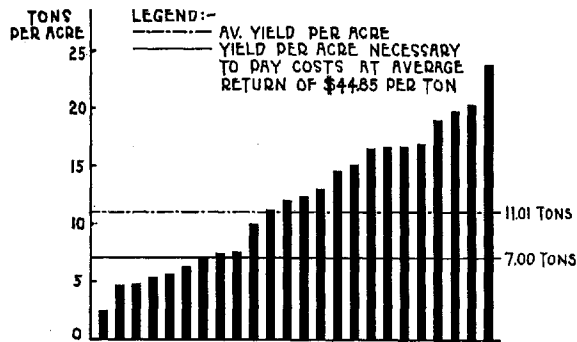


Fig. 8. Each bar indicates the average per acre yield of pears obtained on one orchard in the Wenatchee District. The 24 bars represent all the pear tracts studied in this area.

Six of the twenty-four farms failed to obtain yields sufficient to pay the expenses of production at the average return of \$44.85 per ton.

A frequency table of the yields follows:

Range in yield per acre	Number of farms
Under 5 tons	3
5.1 to 10 tons	6
10.1 to 15 tons	6
15.1 to 20 tons	7
Over 20 tons	2

The wide range in yields would seem to indicate that many of the producers are not obtaining the yields which should be possible. See page 17 for a discussion of the future outlook for the pear producer.

Depreciation on Soft Fruit Plantings, Wenatchee District.

All legitimate costs have been included on each soft fruit except depreciation on the trees themselves. The young tree increases in value until full bearing age is reached. Eventually the tree must be replaced when its age or disease conditions prevent it from bearing profitable crops of fruit.

In the Wenatchee Valley the average value of land in full bearing apricots was \$956.00 per acre on the farms studied. The same land with trees removed was estimated to be worth \$188.85 per acre. Total depreciation on trees would be the difference between these values or \$767.15 per acre. Growers estimated apricot trees to be in full bearing at 7.3 years and to have an average life of 22.4 years. With 15.1 of full production years, to bear the total depreciation charge the yearly cost for this item becomes \$50.80 per acre. Since the average yield was 2.8 tons per acre this charge would add \$18.14 per ton to the cost of production of Wenatchee apricots. A summarized tabulation of depreciation charges for each Wenatchee soft fruit is presented in Table 9.

Table 9. *Depreciation on soft fruit plantings—Wenatchee District.

	Apricots	Cherries	Peaches	Pears
Yearly depreciation in dollars				
on each acre	\$50.80	\$74.07	\$53.06	\$40.65
Average yield per acre	2.8 tons	8093 lbs.	768 bxs.	11.01 tons
Additional cost per unit due to depreciation	\$18.14	\$ 0.0092	\$ 0.069	\$ 3.69

* See Table 24 of appendix for detailed information.

Labor Expenditures on the Soft Fruit Crops, Wenatchee District

Table 10 lists the amount of labor expended per acre on each job in growing the soft fruit crops. Methods of performing the same job varied widely from farm to farm. One grower did his cultivating with a team and disc while his neighbor used tractor equipment for the same job. In Table 10 the various practices have been averaged separately.

Directly under the heading "apricots" in the second division of the table the number of farms included in the study is stated together with the number of acres involved. The first entry under apricot pruning indicates that 122.6 acres were averaged to get the figure of 25.8 hours of man labor per acre. Since the total acreage of apricots studied is 122.6 acres we see that 100% of the data is included in this average. By similar comparisons of the acres included in each average figure with the total acreage of the crop studied one may judge as to the commonness of the practice and the accuracy of the average figure given.

For those unfamiliar with the labor processes involved a short explanation of terms is presented:-

Pruning:—Trimming out dead or superfluous wood from the tree.

Brush disposal:—Picking up and hauling out the brush caused by pruning.

Cultivating:—Discing, springtoothing, subsoiling or plowing the ground.

Ditching:—Making the furrows by means of which irrigation water is conveyed from tree to tree.

Irrigating:—The labor involved in caring for the irrigation water.

Pollenizing:—The introduction of blossoms of other cherry varieties to thus effect better pollination and secure a larger set of fruit.

Dormant spraying:—The labor involved in spraying in early spring before the blossoms or leaves come out.

Cover spraying:—The labor of applying sprays during the growing season.

Heating:—The labor in keeping the temperature above freezing during

Table 10. Labor Expenditures per acre—Wenatchee District.

Operation	Apricots 25 Farms 122.6 Acres						Cherries 27 Farms 55.6 Acres						Peaches 25 Farms 70.9 Acres						Pears 24 Farms 74.4 Acres																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
	Horse Operations			Tractor Operations			Horse Operations			Tractor Operations			Horse Operations			Tractor Operations			Horse Operations			Tractor Operations																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
	Acres p.	Hours		Avg. d.	M	H	T*	Acres p.	Hours		Avg. d.	M	H	T	Acres p.	Hours		Avg. d.	M	H	T	Acres p.	Hours		Avg. d.	M	H	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
		M*	H*						M	H						M	H						M	H					M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
Pruning	122.6	25.8					52.6	23.4	6.1	16.7	2.7	1.5	37.7	7.4	1.1	24.2	4.7	2.2	67.8	6.9	8.6		74.4	42.1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

* M = Man hour, H = Horse hour, T = Tractor hour.

† Man hour with stationary plant.

the blossoming period by lighting numerous small fires throughout the orchard.

Thinning: The removal of a portion of the fruit while still small to throw all the tree's resources into the production of a normal amount of larger and better quality fruit.

Propping: The placing of supports under the main limbs of the tree to prevent their breaking under heavy loads of fruit.

Cutting sprouts: The removal of new shoots that would otherwise develop into superfluous branches.

Hoeing around trees: Clearing the cover crop away from the base of the tree to prevent mice injury during the winter months.

The following charges per hour for the Wenatchee District were obtained by averaging the rates used on the four soft fruits studied:-

Crew	Rate per hour
One man	.40
Minor machine	.05
One horse	.175
Tractor and driver	2.34
Portable spray rig including hauling power but no man labor	1.39
Stationary spray plant (no man labor)	1.53

Cost of Producing Apricots in the Yakima District

(See page 20 for detailed explanation of terms and methods of figuring costs)

These twenty-four farms producing apricots were located in Naches Heights and similar districts lying west of the city of Yakima. The average age of trees was 74 years; the range being from five to eleven years. It is likely that the average yield would be somewhat higher had it been possible to select better trees. Yakima growers estimated apricots to be in full production at 7 years.

Orchard heating was practiced on only one large orchard included in the study.

The final cost of \$55.35 per ton when subtracted from the average return leaves a net profit of \$18.57 per ton or \$64.07 per acre on the average yield of 3.45 tons per acre. Figure 9 shows the average yield secured by each of the 24 farms studied. The costs of apricot production in the Yakima District are shown in Table 11.

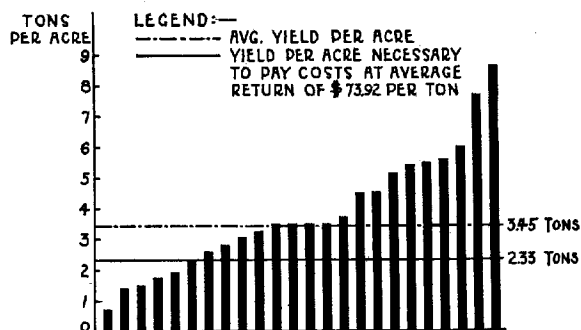


Fig. 9. Each bar indicates the average per acre yield of apricots obtained on one orchard in the Yakima District. The 24 bars represent all the apricot tracts studied in this district.

Five of these farms failed to obtain yields of sufficient size to pay production costs. A frequency distribution of yields shows that 15 of the 24 farms had average yields not to exceed 4 tons:-

Range in yield	Number of farms
Up to 2 tons.....	5
2.01 to 3 tons.....	3
3.01 to 4 tons.....	7
4.01 to 5 tons.....	2
5.01 to 6 tons.....	5
6.01 to 7 tons.....	0
7.01 to 8 tons.....	1
8.01 to 9 tons.....	1

Depreciation on the orchard planting which is also an item of cost is treated separately on page 59. Page 8 should be consulted for a discussion of the outlook for apricot production.

Table 11. The Cost of Producing Apricots on 24 Farms in the Yakima Valley.

	PER ACRE FIGURES	PER TON FIGURES
Average Yield per Acre	3.45 T.	
OVERHEAD COSTS		
Land investment per acre		
Average of 24 farms.....	\$973.58	
*6% interest on land value	\$58.42	\$16.94
Equipment investment per acre		
Average of 24 farms.....	\$ 13.53	
* 6% interest on investment	.81	
* Depreciation	2.23	
Total equipment costs	3.04	.88
Irrigation system investment per acre		
Average of 24 farms.....	\$ 13.90	
* 6% interest on investment	.83	
* Depreciation	1.11	
Repairs	.10	
Total system costs	2.04	.59
Miscellaneous overhead charges		
* Land tax	8.04	
* Water tax	6.18	
Liability insurance	.01	
Total miscellaneous costs	14.23	4.13
TOTAL OVERHEAD COSTS	77.73	22.54

* Costs that do not normally vary with yield.

(Continued on next page)

(Table 11 Continued)

	PER ACRE FIGURES	PER TON FIGURES
CULTURAL MATERIAL COSTS		
*Spray material	\$2.89	\$
*Fuel for heaters	5.10	
*Fertilizer or manure (cost spread)	8.61	
Miscellaneous	.18	
Total cultural material	16.78	4.86
CULTURAL LABOR COSTS		
*Pruning	12.56	
*Brush disposal	2.87	
*Cultivating (Disc, harrow or plow)	4.94	
*Ditching out	1.62	
*Irrigating	10.01	
*Spray labor	2.19	
*Heating labor	1.55	
Thinning	15.79	
Propping	1.41	
*Cutting sprouts	.05	
*Hoeing around trees	1.57	
Miscellaneous	.18	
Total cultural labor costs	54.74	15.87
Interest on operating expense to harvest	2.57	.75
Total cost ready to harvest without interest on land	93.40	27.08
Total cost ready to harvest with interest on land	151.82	44.02
HARVESTING COSTS		
Picking		7.68
Hauling in and out of orchard		1.19
Hauling to warehouse		1.45
Supervising harvest labor		.68
Total harvesting labor	37.92	11.00

Table 11 (Continued)

Interest on operating expense during harvest	\$ 1.14	\$.33
Total cost delivered at warehouse (Excluding land interest)	132.46	38.41
Total cost delivered at warehouse (Including land interest)	190.88	55.35
Average receipts per ton		73.92
Net profit per ton		18.57

* Costs that do not normally vary with yield.

Cost of Producing Cherries in the Yakima District.

(See page 20 for detailed explanation of terms and method of figuring costs.)

The twenty-four farms on which cherry figures are based were scattered over a territory extending from Parker Heights to Grandview. The average age of trees was 16.2 years with the growers estimating cherry trees to be in full bearing at 12.69 years. The Bing and Royal Anne (Napoleon) are the main commercial varieties and the average returns given in the cost figures refer to the Bing cherry. Eleven of the 24 farms practiced orchard heating and 22 hired bees as an aid in pollination. Eleven farms banded the trunk and main branches of their cherry trees with cloth bands or various sticky substances to prevent the cut worm from ascending the tree and injuring the foliage.

With average returns of 11 cents, a profit of 4 2-5 cents per pound or \$312.18 per acre was realized on the average yield of 7095 pounds per acre. Returns are greatly affected by the earliness with which the fruit ripens in any locality. The itemized production costs are shown in Table 12.

A discussion of this important factor will be found on page 30. Figure 10 shows the average yields obtained by each grower interviewed.

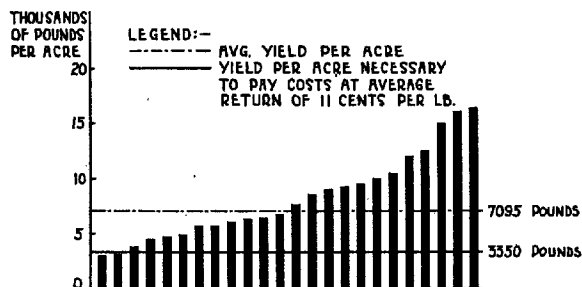


Fig. 10. Each bar indicates the average per acre yield of sweet cherries obtained in one orchard in the Yakima District. The 24 bars represent all the cherry tracts studied in this district.

Table 12. The Average Cost of Producing Cherries on 24 Farms in the Yakima Valley.

	PER ACRE FIGURES	PER POUND FIGURES
Average Yield per Acre	7095 pounds	
OVERHEAD COSTS		
Land investment per acre		
Average of 24 farms.....	\$1553.00	
*6% interest on land value	\$93.18	\$.0131
Equipment investment per acre		
Average of 24 farms.....	105.16	
* 6% interest on investment	6.31	
* Depreciation	20.47	
Repairs	.40	
Miscellaneous	.40	
Total equipment costs	27.58	.0039

* Costs that do not normally vary with yield.

(Continued on next page)

Table 12 (Continued)

	PER ACRE FIGURES	PER POUND FIGURES
Irrigation system investment per acre		
Average of 24 farms.....	27.56	
*6% interest on investment	\$1.65	\$
* Depreciation	2.34	
Repairs	1.03	
Total system costs	5.02	.0007
Miscellaneous overhead charges		
* Land tax	9.46	
* Water tax	6.19	
Liability insurance	2.79	
Total miscellaneous overhead	18.44	.0026
TOTAL OVERHEAD COSTS	144.22	.0203
CULTURAL MATERIAL COSTS		
* Spray material	9.90	
* Fuel for heaters	22.06	
* Fertilizer or manure (cost spread)	29.96	
* Bee hire	5.78	
* Banding material	.54	
Miscellaneous	.16	
Total cultural material	68.40	.0096
CULTURAL LABOR COSTS		
* Pruning	10.28	
* Brush disposal	3.32	
* Cultivating (Disc, harrow or plow)	10.44	
* Ditching out	3.83	
* Irrigating	11.37	
* Pollenizing	.70	
* Spray labor	10.77	
* Heating labor	12.37	
* Banding trees	1.61	
* Hoeing around trees	1.98	
Miscellaneous labor	1.56	
Total cultural labor cost	68.23	.0096

(Continued on next page)

* Costs that do not normally vary with yield.

Table 12 (Continued)

	PER ACRE FIGURES	PER POUND FIGURES
Interest on operating expense to harvest	4.71	.0007
Total cost ready to harvest without interest on land	\$192.38	\$.0271
Total cost ready to harvest with interest on land	285.56	.0402
HARVESTING COSTS		
Picking		.0202
Hauling in and out of orchard		.0016
Hauling to warehouse		.0016
Supervising harvest labor		.0016
Total harvest costs	177.05	.0250
Interest on operating expense during harvest	5.31	.0007
Total cost delivered at warehouse (Excluding interest on land)	374.74	.0528
Total cost delivered at warehouse (Including interest on land)	467.92	.0659
Average receipts per pound		.1100
Net profit per pound		.0441

* Costs that do not normally vary with yield.

Only two of the 24 growers failed to obtain the yield of 3350 pounds necessary to meet production costs. The wide spread between this yield and the average yield of 7095 pounds per acre indicates the substantial margin of profit realized by the average grower.

Yields on the farms studied were grouped as follows:-

Range in yield per acre	Number of farms
Under 4000 pounds	3
4001 to 8000 pounds	10
8001 to 12000 pounds	7
12001 to 16000 pounds	3
16001 to 20,000 pounds	1

While cherries proved to be the most profitable soft fruit in this study indications are that the present degree of profit cannot continue. A discussion of the future outlook for cherry production will be found on page 11.

Cost of Producing Peaches in the Yakima District.

(See page 20 for detailed explanation of terms and methods of figuring costs.)

The 26 farms on which peach costs are based were located chiefly in the Parker Heights and Lombard Loop areas. Elberta was the chief variety. Growers estimated peach trees to be in full bearing at 8 years, the average age of trees being 17 years. Building costs are those on the structure used in packing the fruit. Ranch packing of peaches is so common that it has been included as part of the cost incurred before delivery to the warehouse. Only 6 of these 26 farms practiced orchard heating. Four farms hired bees to aid in pollination and 19 of the 26 growers used material and labor in banding trees to prevent cutworm injury to the foliage.

A profit of 14 3-5 cents per box or \$155.25 per acre was realized on an average yield of 1035 boxes per acre.

All costs have been included as shown in Table 13 except that for depreciation on the trees themselves. This cost is discussed on page 59.

Table 13. The Average cost of producing Peaches on 26 Farms in the Yakima Valley.

	PER ACRE FIGURES	PER BOX FIGURES
Average Yield per Acre	1035 boxes	
OVERHEAD COSTS		
Land investment per acre		
Average of 26 farms.....	\$1151.95	
* 6% interest on land value	\$69.12	\$.0668

* Costs that do not normally vary with yield.

(Continued on next page)

Table 13 (Continued)

	PER ACRE FIGURES	PER BOX FIGURES
Equipment investment per acre		
Average of 26 farms.....	35.38	
* 6% interest on investment	\$2.12	\$
* Depreciation	6.56	
Repairs	.09	
Total equipment costs	8.77	.0085
Building investment per acre		
Average of 26 farms.....	40.65	
* 6% interest on investment	2.44	
* Depreciation	2.52	
Repairs	.05	
Miscellaneous	.02	
Total building costs	5.03	.0049
Irrigation system investment per acre		
Average of 26 farms.....	22.24	
* 6% interest on investment	1.34	
* Depreciation	1.70	
Repairs	.62	
Miscellaneous	.48	
Total system costs	4.14	.0040
Miscellaneous overhead charges		
* Land tax	9.02	
* Water tax	9.21	
Liability insurance	1.38	
Total miscellaneous costs	19.61	.0189
TOTAL OVERHEAD COSTS	106.67	.1031

* Costs that do not normally vary with yield.

(Continued on next page)

Table 13 (Continued)

	PER ACRE FIGURES	PER BOX FIGURES
CULTURAL MATERIAL COSTS		
* Spray material	\$13.84	\$
* Fuel for heaters	1.93	
* Fertilizer or manure (cost spread)	14.59	
* Bee hire	.14	
Miscellaneous.	.01	
* Banding material	2.82	
Total cultural material	33.33	.0322
CULTURAL LABOR COSTS		
* Pruning	18.17	
* Brush disposal	5.84	
* Cultivating (Disc, harrow or plow)	8.44	
* Ditching out	2.76	
* Irrigating	20.93	
* Spray labor	7.69	
* Heating labor	1.69	
* Banding labor	3.40	
Thinning	9.84	
Propping	3.11	
* Hoeing around trees	1.43	
Miscellaneous	2.12	
Total cultural labor cost	85.42	.0825
Interest on operating expense to harvest	4.19	.0040
Total cost ready to harvest without interest on land	160.49	.1550
Total cost ready to harvest with interest on land	229.61	.2218
HARVESTING COSTS		
Picking		.0526
Hauling in and out of orchard		.0112
Hauling to warehouse		.0144
Supervising field labor		.0057

* Costs that do not normally vary with yield.

(Continued on next page)

Table 13 (Continued)

	FIGURES PER ACRE	FIGURES PER BOX
Packing labor	\$	\$.0356
Packing material (box-paper-nails)		.0958
Lidding and "flunky"		.0119
Supervising packing labor		.0057
Total harvesting costs	241.10	2329
Interest on operating expense during harvest	7.23	.0070
Total cost delivered at warehouse (Excluding land interest)	408.82	.3949
Total cost delivered at warehouse (Including land interest)	477.94	.4617
Average receipts per box		.6080
Net profits per box		.1463

* Costs that do not normally vary with yield.

Figure 11 shows the average yield secured on individual farms.

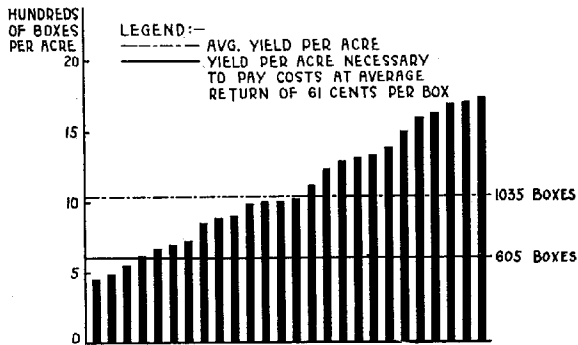


Fig. 11. Each bar indicates the average per acre yield of peaches obtained on one orchard in the Yakima District. The 26 bars represent all the peach tracts studied in this area.

Only three farms failed to obtain yields large enough to pay production costs. The range in yields obtained follows:-

Range in yields per acre	Number of farms
Under 500 boxes.....	2
501 to 1000 boxes.....	10
1001 to 1500 boxes.....	8
Over 1500 boxes.....	5

A discussion of the future outlook for peach production in this state is given on page 14.

Cost of Producing Pears in the Yakima District.

(See page 20 for detailed explanation of terms and methods of figuring costs).

The 22 Yakima orchards on which pear data were taken are located in the Parker Heights area. Growers estimated pear trees as in full bearing at 11 years. The average age of trees was 17.7 years and the chief variety is Bartlett. The average returns listed in Table 14 are for Bartlett pears.

Table 14. The Average cost of producing Pears on 22 Farms in the Yakima Valley.

	PER ACRE FIGURES	PER TON FIGURES
Average Yield per Acre	11.84 T.	
OVERHEAD COSTS		
Land investment per acre		
Average of 22 farms.....	\$1219.58	
* 6 % interest on land value	\$73.17	\$6.18
Equipment investment per acre		
Average of 22 farms.....	23.51	
* 6% interest on investment	1.41	
* Depreciation	5.21	
Total equipment costs	6.62	.56

* Costs that do not normally vary with yield.

(Continued on next page)

Table 14 (Continued)

	PER ACRE FIGURES	PER TON FIGURES
Irrigation system investment per acre		
Average of 22 farms.....	\$14.30	
* 6% interest on investment	\$.86	\$
* Depreciation	1.35	
Repairs	.04	
Miscellaneous	.26	
Total system costs	2.51	.21
Miscellaneous Overhead Costs		
* Land tax	8.49	
* Water tax	3.43	
Liability insurance	1.07	
Total miscellaneous overhead	12.99	1.10
TOTAL OVERHEAD COSTS	95.29	8.05
CULTURAL MATERIAL COSTS		
* Dormant spray material	7.29	
* Cover spray material	7.97	
* Fuel for heaters	2.30	
* Fertilizer or manure (cost spread)	8.96	
* Bee hire	.05	
Miscellaneous	.10	
Total cultural material	26.67	2.25
CULTURAL LABOR COSTS		
* Pruning	21.00	
* Brush disposal	4.32	
* Cultivating (Disc, harrow or plow)	6.84	
* Ditching out	2.63	
* Irrigating	11.29	
* Dormant spray labor	5.60	
* Cover spray labor	17.22	
* Heating labor	1.93	
* Cutting blight	4.26	

* Costs that do not normally vary with yield.

(Continued on next page)

Table 14 (Continued)

	PER ACRE FIGURES	PER TON FIGURES
Thinning	\$3.85	\$
Propping	.69	
* Hoeing around trees	1.42	
Miscellaneous	2.41	
Total cultural labor cost	83.46	7.05
Interest on operating expense to harvest	3.70	.31
Total cost ready to harvest without interest on land	135.95	11.48
Total cost ready to harvest with with interest on land	209.12	17.66
HARVESTING COSTS		
Picking		4.43
Hauling in and out of orchard		.81
Hauling to warehouse		.95
Supervising harvest labor		.45
Total harvesting costs	78.71	6.64
Interest on operating expense during harvest	2.36	.20
Total cost delivered at warehouse (Excluding interest on land)	217.02	18.32
Total cost delivered at warehouse (Including interest on land)	290.19	24.50
Average receipts per ton		44.42
Net profit per ton		19.92

* Costs that do not normally vary with yield.

The average water tax of \$3.43 per acre is low because 40 of the 150 acres studied enjoy free water under some of the early water rights in the district. Seven of the 22 growers heated their orchards and 2 hired bees for pollination. Nineteen of the 22 growers expended labor in cutting out fire blight. Notwithstanding the wide spread of the disease in this

area it seems to be successfully combatted and very little reduction in yield may be attributed to this cause. The \$4.26 per acre charge for the labor used in blight cutting of course adds to the cost of production. A profit of \$19.92 per ton or \$235.85 per acre was the average return on a yield of 11.84 tons. Depreciation on the trees themselves, the only legitimate charge not included in these figures, is discussed on page 59.

Figure 12 shows the average yields obtained by the individual growers.

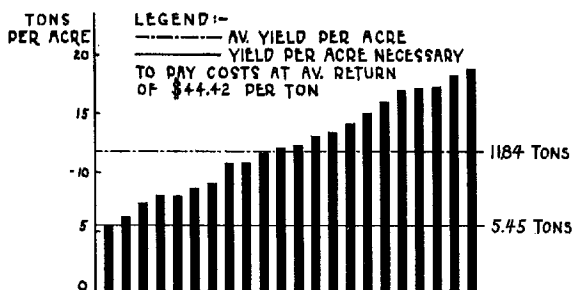


Fig. 12. Each bar indicates the average per acre yield of pears obtained on one orchard in the Yakima District. The 22 bars represent all the pear tracts studied in this area.

All farms produced yields large enough to break even with costs and the wide spread between the 5.45 tons required for this purpose and the average yield of 11.84 tons per acre indicates the profit obtained. Yields on these ranches were distributed as follows:-

Range in yield per acre	Number of farms
Under 5 tons.....	0
5.01 to 10 tons.....	7
10.01 to 15 tons.....	9
15.01 to 20 tons.....	6

The wide dispersion would indicate that yields might be increased on some of these farms with a resultant cutting of production costs.

A discussion of the future outlook for the pear industry will be found on page 17.

Depreciation on Soft Fruit Plantings—Yakima District

In addition to the costs already figured one other is a legitimate charge. At full bearing age each acre has considerable value due to the trees themselves. When the productive life of the tree is over the value of the acre drops back to that of the unplanted land with its water right and irrigation system. In actual practice the grower does not permit the land to revert to the virgin state but replaces each tree as it dies thus constantly renewing the planting. Renewal cost would be nearly the same whether we figure the work done all in a single year or piece meal over many years.

Table 15 summarizes depreciation charges on the soft fruit crops for the Yakima District. For further details and method of calculation see Table 24 of the appendix on page 69.

Table No. 15. *Depreciation on Soft Fruit Plantings—Yakima District.

	Apricots	Cherries	Peaches	Pears
Yearly depreciation in dollars on each acre.	\$55.59	\$47.33	\$64.74	\$31.37
Average yield per acre	3.45 Tons	7095 lbs.	1035 boxes	11.84 Tons
Additional cost per unit due to depreciation.	\$16.11	\$0.0067	\$0.063	\$ 2.65

* See Table 24 of appendix for detailed information.

Table 16 presents the hours of labor used by men, horses, or tractors in performing the various cultural operations. Here, as in Wenatchee, methods varied widely and the reader is cautioned to compare the number of acres on which each average figure is based with the total acres studied to judge how representative the average figure really is. In pruning apricots 77.5 acres were averaged to obtain the item of 33.2 man hours per acre. Since 77.5 acres are the total acres studied, 100% of the records have been included in the average pruning figure. About half the growers disposed of brush with teams and the other half used tractors and brushrakes which makes either average figure more open to the influences of differing practices of the individual growers included in the average.

The average of the rates per hour used in calculating the costs on all four fruits in the Yakima area were:-

Crew	Rate per hour
One man.....	\$.37
One horse.....	.11
Minor machine.....	.05
Tractor and driver.....	2.06
Portable spraying rig including hauling power but no man labor.....	1.42

Effect of Yield on Cost of Producing the Soft Fruit Crops

Possibly no other single factor has as much influence on production cost per unit as the yield obtained. A large part of the cost must be met regardless of yield. Interest and depreciation on the various investments, land and water taxes, and many of the labor and material costs must be sustained in the year of crop failure to prepare for a crop the following year. These items are called "fixed costs". On the Yakima farms 44.22% of the cost of production of peaches was made up of charges of this nature. In all the cost figures presented those charges which do not normally vary with yield are indicated by a star(*) preceding the charge. Table 17 is presented to illustrate the effect of yield and price on net returns to peach growers. As yield decreases "fixed costs" constitute an ever increasing proportion of the entire production expense. With 200 box yields the per box cost is \$1.31 while 1800 box yields reduce this cost to 37 cents. Returns to the grower being 25 cents per box, a loss of 12 cents is realized on each box when 1800 boxes are produced per acre. At 50 cents, yields between 800 and 1000 boxes must be obtained to break even with costs. At 75 cents per box, yields between 400 and 600 boxes begin to show some measure of profit.

Table 18 indicates the yields which must be obtained in each district to pay all expenses of production. For any measure of profit yields exceeding these must be obtained. These figures are based on the average costs computed for the soft fruits in each valley.

Table 16. Labor Expenditures per Acre—Yakima District.

Operation	Apricots 77.5 Acres						Cherries 57.2 Acres						Peaches 149.4 Acres						22 Farms 150.0 Acres					
	Horse Operations			Tractor Operations			Horse Operations			Tractor Operations			Horse Operations			Tractor Operations			Horse Operations			Tractor Operations		
	Acres	Hours		Acres	Hours		Acres	Hours		Acres	Hours		Acres	Hours		Acres	Hours		Acres	Hours		Acres	Hours	
		M*	H*		M	T*		M	H		M	T		M	H		M	T		M	H		M	T
		Avg. d.			Avg. d.			Avg. d.			Avg. d.			Avg. d.			Avg. d.			Avg. d.			Avg. d.	
Pruning	77.5	33.2		53.2	28.2		149.4	50.5		133.4	11.6	13.8	150.0	56.9		131.0	5.1	4.4	150.0	56.9		131.0	5.1	4.4
Brush disposal	37.5	6.1	7.7	52.0	5.2	9.4	33.8	19.3	33.5	70.0	3.2	8.2	146.0	7.8	10.6	131.0	16.6	14.3	146.0	7.8	10.6	131.0	16.6	14.3
Cultivating	55.8	2.4	5.8	41.5	1.0	1.0	36.0	10.9	24.1	18.5	3.3	3.3	36.0	10.9	24.1	18.5	3.3	3.3	36.0	10.9	24.1	18.5	3.3	3.3
Ditching	86.0	3.2	5.8	41.5	1.0	1.0	50.0	4.7	9.2	136.9	3.4	5.6	132.0	3.3	6.0	132.0	3.3	6.0	132.0	3.3	6.0	132.0	3.3	6.0
Irrigating	77.5	26.0		57.2	29.3		149.4	56.9		149.4	56.9		150.0	32.7		150.0	32.7		150.0	32.7		150.0	32.7	
Pollinating				16.5	5.2																			
Dormant Spraying	39.6	2.7	2.6	41.3	10.0	11.1	138.4	8.2	7.3															
Cover spraying	17.0	13.6	8.2	28.0	42.7	22.0	37.3	16.8	11.7															
Heading				24.8	6.8		32.9	11.0																
Battling blight																								
Thinning	71.8	44.8		110.4	25.6		125.1	6.2	8.2															
Propping	10.1	13.2	10.3																					
Hoing around trees	39.7	8.0		34.3	8.3		92.8	7.7																

* M = Man hour, H = Horse hour, T = Tractor hour.

Table 17. Effect of Yields and Price on Net Returns per Box of Peaches—Yakima District

Yield in Boxes	Fixed Costs per Acre	Variable Costs per Acre	Total Costs per Acre	Cost per box Delivered at Warehouse	Varying Price Assumptions					
					Net return per box when price is					
					25¢	50¢	75¢	\$1.00	\$1.25	\$1.50
200	\$211.36	\$ 51.50	\$262.86	\$ 1.31	†-1.06	-.81	-.56	-.31	-.06	.19
400	211.36	103.03	314.39	.79	— .54	-.29	-.04	.21	.46	.71
600	211.36	154.54	365.90	.61	— .36	-.11	.14	.39	.64	.89
800	211.36	206.04	417.40	.52	— .27	-.02	.23	.48	.73	.98
1000	211.36	257.57	468.93	.47	— .22	.03	.28	.53	.78	1.03
1035	211.36	266.58	477.94	.46	— .21	.04	.29	.54	.79	1.04
1200	211.36	309.07	520.43	.43	— .18	.07	.32	.57	.82	1.07
1400	211.36	360.60	571.96	.41	— .16	.09	.34	.59	.84	1.09
1600	211.36	412.11	623.47	.39	— .14	.11	.36	.61	.86	1.11
1800	211.36	463.61	674.97	.37	— .12	.13	.38	.63	.88	1.13

* Actual costs found in survey from which other costs are computed.

† (—) indicates a minus quantity or loss.

Table 18. *Yields Necessary to Break Even With Costs.

District	Apricots	Cherries	Peaches	Pears
Yakima	2.33 Tons	3350 lbs.	605 boxes	5.45 Tons
Wenatchee	2.42 Tons	2825 lbs.	450 boxes	7.0 Tons

* Table 23 of appendix gives detailed information.

In Tables 19 and 20 the growers of each soft fruit have been grouped according to the yields obtained and their costs of production averaged. In nearly all cases a definite relationship between yield and cost is demonstrated. As yields increase costs decrease. Only yields obtained by normal methods reap the full benefit of reduced cost. Extreme measures such as excessive fertilizer applications and abnormal expenditures of labor will add costs which reduce the profit secured by yield increases.

Yearly Variations in Yield to be Expected.

The natural tendency toward alternate bearing and failure to set fruit due to such factors as freezing weather or heavy rains at the blossoming period result in wide variations in annual yields of the soft fruit crops.

Figure 13 shows the total production of peaches and pears for Washington over the six year period of 1923 to 1928.

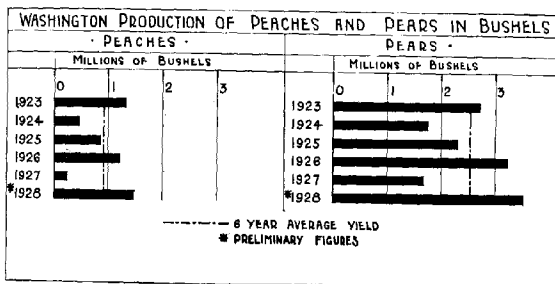


Fig. 13. Total production of Washington peaches and pears for the period 1923-1928 inclusive. See Table 26 of appendix for detailed figures.

Peach production in the State of Washington varied from 250,000 bushels in 1927 to 1,470,000 bushels in 1928. Pears varied from a low of 1,670,000 bushels in 1927 to a high of 3,500,000 bushels in 1928.

**Table 19. Effect of Yield on Cost of Producing the Soft Fruit Crops,
Yakima District.**

Kind of Fruit	Range in Yield Per Acre	Number of Farms Averaged	Average Yield Per Acre	* Average Cost to Produce and Deliver at Warehouse
Apricots	Up to 2 T.	5	1.47 T.	\$98.68
	2.01 to 3.00 T.	3	2.57 T.	76.24
	3.01 to 4.00 T.	7	3.43 T.	68.86
	Over 4 T.	9	5.89 T.	44.70
Cherries	Up to 6000 lbs.	8	4,400 lbs.	.10
	6001 to 9000 lbs.	6	6,963 lbs.	.07
	9001 to 12000 lbs.	6	10,057 lbs.	.05
	Over 12000 lbs.	4	14,968 lbs.	.04
Peaches	Up to 500 bxs.	2	466 bxs.	.73
	501 to 750 bxs.	5	648 bxs.	.57
	751 to 1000 bxs.	6	935 bxs.	.55
	Over 1000 bxs.	13	1424 bxs.	.40
Pears	Up to 7 T.	2	5.84 T.	48.24
	7.01 to 14 T.	12	10.43 T.	27.80
	Over 14 T.	8	16.70 T.	22.12

* All fruits delivered in bulk to warehouse except peaches which are ranch packed.

Such conditions might almost be considered normal in soft fruit production and while high prices may compensate for short crops they do not do so if there is no crop to harvest. Extreme care should be used in locating the soft fruit orchard. Deep and fertile soil, good air and water drainage, southern exposures and similar factors increase the chances for crops of normal size each year.

Comparisons of the Soft Fruit Crops

Table 21 gives some indication in a general way of the relative profits from the soft fruit crops. On the farms studied in both areas cherries showed the greatest profit per acre followed in order by pears, peaches and apricots. The fact that this situation has obtained for the past few years is by no means an indicator that the relationship will always prevail.

Table 20. Effect of Yield on Cost of Producing the Soft Fruit Crops,
Wenatchee District.

Kind of Fruit	Range in Yields Per Acre	Number of Farms Averaged	Average Yield Per Acre	* Average Cost to Produce and Deliver at Warehouse
Apricots	Up to 2 T.	6	1.81 T.	\$106.20
	2.01 to 3.00 T.	11	2.69 T.	77.15
	3.01 to 4.00 T.	4	3.67 T.	59.70
	Over 4.00 T.	4	5.01 T.	52.59
Cherries	Up to 6000 lbs.	7	4900 lbs.	.08
	6001 to 9000 lbs.	6	7672 lbs.	.06
	9001 to 12000 lbs.	8	10971 lbs.	.05
	Over 12,000 lbs.	6	16,895 lbs.	.04
Peaches	Up to 500 bxs.	6	428 bxs.	.76
	501 to 750 bxs.	8	680 bxs.	.56
	751 to 1000 bxs.	6	935 bxs.	.46
	Over 1000 bxs.	5	1415 bxs.	.42
Pears	Up to 7 T.	7	5.17 T.	55.69
	7.01 to 14 T.	7	10.51 T.	33.81
	Over 14 T.	10	17.93 T.	26.72

* All fruits delivered in bulk to warehouse except peaches which are ranch packed.

Overproduction on the tree fruits is far more serious than overproduction on annual crops where one sows and reaps the crop in a single year's time. After 7 to 10 years investment in bringing an orchard into bearing the grower does not readily abandon his enterprise and surpluses due to over planting are likely to be painfully felt for a considerable period of time.

In Table 21 it will be seen that all soft fruits studied were well within the full bearing period with the exception of Yakima apricots which had on the average just reached full bearing age. Average prices paid for the various soft fruits in the Yakima area are quite similar to returns received by the Wenatchee growers during the same years. Widest differences between districts occur in yields per acre and in total costs. These differences may be explained by the variations in local conditions on each farm in yields obtained, labor costs, land and water taxes, production methods and burden of overhead costs. For those interested

Table 21. Comparisons on the Soft Fruit Crops

Kind of Fruit	District	Number of Farms Averaged	Average Age of Trees	Average Yield per Acre	* Average Cost per Unit Delivered Warehouse	Average Return Per Unit	Average Per Unit	Average Yield per Acre
Apricots	Yakima	24	7.4 yrs.	3.45 T.	\$55.35	\$73.92	\$18.57	\$ 64.07
	Wenatchee	25	12.6 yrs.	2.8 T.	72.06	79.42	7.36	20.61
Cherries	Yakima	24	16.2 yrs.	7095 lbs.	.066	.110	.044	312.18 *
	Wenatchee	27	20.0 yrs.	8093 lbs.	.058	.114	.056	453.21
Peaches	Yakima	26	17.0 yrs.	1035 bxs.	.46	.61	.15	155.25
	Wenatchee	25	15.4 yrs.	768 bxs.	.48	.63	.15	115.20
Pears	Yakima	22	17.7 yrs.	11.84 T.	24.50	44.42	19.92	235.85
	Wenatchee	24	16.0 yrs.	11.01 T.	31.92	44.85	12.93	142.36

* All fruits delivered in bulk to warehouse except peaches which are ranch packed.

